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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/654,776	09/05/2000	Chia-Ta Hsieh	TSMC98-231B	9675

28112 7590 06/18/2003

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EXAMINER
LOKE, STEVEN HO YIN

ART UNIT	PAPER NUMBER
2811	

DATE MAILED: 06/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/654,776	HSIEH ET AL.	
	Examiner	Art Unit	
	Steven Loke	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 April 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *29 and 33-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *29 and 33-35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

1. The abstract of the disclosure is objected to because the abstract should disclose the structure of the device instead of the method to make the device. The claimed invention is directed to a device structure. Correction is required. See MPEP § 608.01(b).

2. Claim 33 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Original claim 33 discloses the opening has a width between about 1500 to 5000 angstroms. The specification never discloses the opening has a width between about 1500 to 35000 angstroms as claimed in claim 33.

3. Claim 29 is objected to because of the following informalities: line 21, the phrase "a self-aligned source. (SAS) line" is unclear whether it is being referred to "a self-aligned source line". Appropriate correction is required.

4. Claims 29 and 33-35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 29, lines 4-5, the phrase "at least two trenches formed to a depth between about 2500 to 5000 angstroms below the surface of said substrate" is unclear whether it is being referred to "at least two trenches each formed to a depth between about 2500 to 5000 angstroms below the surface of said substrate"; lines 6-7, the phrase "an oxide

layer formed over said substrate, including over the inside walls of said two trenches" is unclear whether it is being referred to "an oxide layer formed over said substrate, including over the inside walls of each of said two trenches".

Claim 29, line 8, the phrase "a high-step oxide formed within said two trenches over the oxide layer..." is unclear. Fig. 8 discloses a high-step oxide [250] formed within each of the two trenches over the corresponding oxide layer [240]. It is believed that a high-step oxide formed within each of said two trenches over the corresponding oxide layer in claim 29.

Claim 29, lines 11-12, the phrase "said high-step oxide forming an opening with high walls over the surface of said substrate between said two trenches" is unclear whether it is being referred to "two of said high-step oxides forming an opening with high walls over the surface of said substrate between said two trenches".

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 29, 34 and 35 insofar, as in compliance with 35 USC 112, are rejected under 35 U.S.C. 103(a) as being unpatentable over Acocella et al.

In regards to claim 29, Acocella et al. disclose a stacked-gate flash memory having a shallow trench isolation with a high-step oxide [12] in fig. 1. It comprising: a substrate [11] having a gate oxide layer [13]; at least two trenches (the two trenches that formed under the oxide layers [12]) each having a depth; an oxide layer (a bottom portion of the

oxide layer [12] that formed along the bottom and sidewalls of the trench) formed over the substrate, including over the inside walls of each of the two trenches; a high-step oxide (a top portion of the oxide layer [12]) formed within each of the two trenches over the oxide layer (a bottom portion of the oxide layer [12] that formed along the bottom and sidewalls of the trench) and protruding upward over the surface of the substrate to a height; two of the high-step oxides forming an opening with high walls over the surface of the substrate between the two trenches; a first conductive layer [14] formed conformally inside and extending above the opening and over the surface of the substrate between the high walls to form a floating gate having internal and external folding surfaces; an intergate oxide layer [15] formed over the internal and external folding surfaces of the floating gate [14]; a second conductive layer [16] formed protruding downward in between said internal and external folding surfaces over the intergate oxide layer [15] to form a control gate [16].

Since the floating gate [16] has folding surfaces, it is inherent that there is high lateral coupling between the floating gate and the control gate.

Acocella et al. differ from the claimed invention by not showing the at least two trenches each formed to a depth between about 2500 to 5000 angstroms below the surface of the substrate. It would have been obvious to one having ordinary skill in the art at the time the invention was made for the at least two trenches each formed to a depth between about 2500 to 5000 angstroms below the surface of the substrate, since it has been held that where the general conditions of a claim are disclosed in the prior

art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Acocella et al. differ from the claimed invention by not showing the high-step oxide formed within each of the two trenches over the oxide layer and protruding upward over the surface of the substrate to a height between about 2000 to 6000 angstroms. It would have been obvious to one having ordinary skill in the art at the time the invention was made for the high-step oxide formed within each of the two trenches over the oxide layer and protruding upward over the surface of the substrate to a height between about 2000 to 6000 angstroms, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

Acocella et al. further differ from the claimed invention by not showing a self-aligned source line. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a self-aligned source line because it is a conventional structure in an array of EEPROM devices.

In regards to claim 34, Acocella et al. further disclose the first conductive layer [14] is polysilicon. Acocella et al. differ from the claimed invention by not showing the first conductive layer having a thickness between about 100 to 500 angstroms It would have been obvious for the first conductive layer having a thickness between about 100 to 500 angstroms, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

In regards to claim 35, Acocella et al. further disclose the second conductive layer [16] is polysilicon. Acocella et al. differ from the claimed invention by not showing the second conductive layer having a thickness between about 1000 to 3000 angstroms It would have been obvious for the second conductive layer having a thickness between about 1000 to 3000 angstroms, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

7. Applicant's arguments with respect to claims 29 and 33-35 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Loke whose telephone number is (703) 308-4920. The examiner can normally be reached on 7:50 am to 5:20 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

sl
June 15, 2003